Access to, interest in and attitude toward e-learning for continuous education among Malaysian nurses

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A R T I C L E   I N F O

S U M M A R Y

Background: Continuous nursing education (CNE) courses delivered through e-learning is believed to be an effective mode of learning for nurses. Implementation of e-learning modules requires pre-assessment of infrastructure and learners' characteristics. Understanding the learners' needs and their perspectives would facilitate effective e-learning delivery by addressing the underlying issues and providing necessary support to learners.
Objective: The aim of this study was to examine access to computer and Internet facilities, interest in and preferences regarding e-learning, and attitudes toward e-learning among nurses in Peninsular Malaysia.
Design: The study utilized a cross-sectional descriptive survey.
Setting: Government hospitals and community clinics in four main regions of Peninsular Malaysia.
Participants: A total of 300 registered nurses.
Method: Data were collected using questionnaires, which consisted of demographic and background items and questions on access to computer and Internet facilities, interest and preferences in e-learning, and attitudes toward e-learning. Descriptive analysis and a chi-squared test were used to identify associations between variables.
Results: Most Malaysian nurses had access to a personal or home computer (85.3%, $n = 256$) and computer access at work (85.3%, $n = 256$). The majority had Internet access at home (84%, $n = 252$) and at work (71.8%, $n = 215$); however, average hours of weekly computer use were low. Most nurses (83%, $n = 249$) did not have an e-learning experience but were interested in e-learning activities. Most nurses displayed positive attitudes toward e-learning. Average weekly computer use and interest in e-learning were positively associated with attitudes toward e-learning.
Conclusion: Study findings suggest that organizational support is needed to promote accessibility of information and communications technology (ICT) facilities for Malaysian nurses to motivate their involvement in e-learning.

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Background

The advancement of scientific discovery in medical and ICT, together with related societal change, have led to increased expectations by populations in various countries that, if required, they will have entry to high-quality patient care. Healthcare consumers are further demanding that nursing care be knowledge-based and that providers have technological expertise and be clinically competent (Levett-Jones, 2005). To ensure that nurses meet these expectations, broad access to well-designed (targeted CNE) programs is required. In many countries, CNE has been recognized as a compulsory requirement of qualification to practice to maintain nursing care quality and minimize the risks for both patients and nurses. The Malaysian Nursing Board (MNB) has imposed 25 credit hours of mandatory CNE (MCNE) for registered nurses (RNs) to renew their license for practice, which is done annually (Nursing and Midwifery Board Malaysia, 2008), and mandates that CNE be available to nurses in both government and private institutions.

However, traditional methods of education such as conferences, workshops, and seminars have been found to deter nurses from participating in CNE due to financial and time constraints, lack of support from supervisors, peers, and organizations, and geographical factors (Chong et al., 2011). To increase the accessibility of CNE, e-learning has been recommended as an alternative to face-to-face education on the basis that it facilitate lifelong learning (Howatson-Jones, 2004; Karaman, 2011; Lahti et al., 2014). The flexibility, accessibility, and convenience of e-learning delivery provides nurses with increased

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opportunities to upgrade their knowledge. CNE courses delivered through e-learning therefore have potential to be effective. However, the implementation of CNE through e-learning requires nurses to have computer and information skills, sufficiently positive attitudes toward e-learning, computers and software, and access to infrastructure and technical support that is available, accessible, affordable, and functional. Accurate assessment of these requirements will help nursing educators facilitate effective e-learning delivery by addressing the underlying issues and providing necessary support. It will also be important for strategic planning and implementation of e-learning modules to assess nurses' perspectives, interest, and preferences regarding e-learning.

Facilities and Information Technology

ICT facilities, computer skills, and information skills are the fundamental requirements for learners to engage successfully in e-learning. Information literacy has become essential for nurses, alongside clinical skills (Button et al., 2013). In a literature review conducted by Button et al. (2013), lack of ICT skills was found to have an impact on learning among students in general. Similarly, technical difficulties with online resources and poor software capability were among the issues reported in a qualitative study, which showed that participants claimed that they needed training and hands-on support (Moule et al., 2010).

In addition, limited access to computers at clinical and placement settings, difficulties accessing the Internet from home, unreliable university computer systems, and lack of technical support discourage use of e-learning resources (Button et al., 2013; Moule et al., 2010). Therefore, providing adequate ICT facilities as well as technical support and training are important to encourage nurses' involvement in e-learning and enhance learning progress. Finally, computer self-efficacy and perceived ease of use also have positive effects in online nursing courses (Tung and Chang, 2008).

Attitudes toward E-Learning

The attitude of the learner is important and contributes to desirable learning outcomes. A positive attitude positively influences learning efficacy, motivation, and knowledge application as well as learning outcomes (Karaman, 2011). The majority of nurses and nursing students have positive perceptions of e-learning, identifying it as an essential component due to its flexibility (Moule et al., 2010), suitable for their working conditions and needs (Karaman, 2011). Similarly, positive attitudes toward web-based learning were also found in a study conducted among public health nurses in Taiwan, a public health context similar to Malaysia, implying that they see e-learning as a key method of in-service education (Yu and Yang, 2006).

In short, implementation of e-learning modules requires pre-assessment of both infrastructure and learner characteristics. This study examined Malaysian nurses' access to computer and Internet facilities, their interests and preferences regarding e-learning, and their attitudes toward e-learning.

The findings of this study provide valuable information to stakeholders in health care provision across the ASEAN region and the MNB in particular. It enables the MNB to plan CNE strategies by considering the opportunities offered by e-learning implementation.

Method

Design

This study was a cross-sectional descriptive survey. Cross-sectional surveys are an effective method for collecting information on the prevalence, distribution, and interrelationship of variables from large populations. Thus, a survey approach was considered appropriate as it required the collection of data from a large sample of Malaysian nurses.

Setting and Participants

A total of 300 RNs were randomly selected from 12 government hospitals and 24 community clinics in each of the four main regions of Peninsular Malaysia. All participants were registered with the Malaysian Nursing and Midwifery Board and had at least one year of nursing experience.

Data Collection

Self-reported questionnaires were used to collect the data. A cover letter and a copy of the questionnaire were included with instructions to participants, who were asked to return the questionnaire in an author-prepaid envelope. In order to improve the response rate, a brief reminder was sent to all participants two weeks after the questionnaires were posted, via regular mail. The questionnaire consisted of demographic and background items, questions on access to computer and Internet facilities, interest and preferences in e-learning, and attitudes toward e-learning. Demographic and background information included gender, age, marital status, number of children, household income, years of experience as a RN, highest level of professional education, and type of institution they were currently employed. In addition, information regarding access to and use of computer facilities at work and home, average time using a computer weekly, access to the Internet, and computer usage (for example, email, browsing Internet, and word-processing) was collected. Participants were asked whether they had e-learning experience, and if so, what type. Participants who had not participated in e-learning were asked if they were interested in engaging in e-learning in the future. All participants were asked their preference for place (at home or at work), time (weekdays, weekends, or evening), course content, reasons for participating in e-learning, fields of interest, and e-learning methods.

Attitudes toward e-learning were assessed using a 28-item scale design, based on the literature review above. Items covered six main areas: use of computer, convenience and flexibility, interaction with facilitators and other students, access to knowledge, positive learning experience, and improvement to nursing care. Participants were asked to rate the extent to which they agreed or disagree with each item using a five-point Likert scale ($1 =$ strongly disagree to $5 =$ strongly agree). Attitude scores thus ranged from 28 to 140, with scores of the median (100) and above considered to indicate positive attitudes toward e-learning. To confirm the content validity of the study, the questionnaire was reviewed by a panel of five experts with extensive experience in nursing education, online teaching, and questionnaire design. Each panel member was asked to comment on the wording and relevance of items, response format, and the overall design of the questionnaire. A content validity index (CVI) was used to compute the expert ratings or each item's relevance. The CVI for the total instrument is the proportion of items rated as either 3 or 4. A CVI of 0.80 or higher indicates good content validity. The overall CVI rating was 0.95, which indicates good acceptability, with a CVI for each item ranging from 0.82 to 1. A reliability analysis for the scale showed high internal consistency reliability, with a Cronbach's alpha of 0.93.

Data Analysis

Data were analyzed using SPSS version 21. The frequency distribution of all variables was examined to check the accuracy of data input and identify the missing values. For descriptive analysis, frequency and percentage were used as categorical data points, and mean and standard deviation for continuous data. A chi-squared test was used to identify associations between variables.

Ethical Consideration

Before commencing the study, permission to survey Malaysian nurses was obtained from the Malaysian Ministry of Health, the Economic Planning Unit of the Malaysian Prime Minister's Department, the Malaysian Ministry of Health Research and Ethics Committee, and the Monash University Human Research Ethics Committee.

The letter of invitation incorporated a plain language statement that detailed the purpose of the study and what it entailed. It provided assurances that participation was voluntary, that all participants would remain anonymous, and that information provided would be treated in strict confidence for statistical purposes only. Return of the completed questionnaire was taken as constituting consent to participate. Confidentiality and anonymity of participants' information was maintained.

Results

Demographic and Background Information

Table 1 summarizes the demographic and background characteristics of the participants. The majority were female (95%, $n = 285$) and married (74.3%, $n = 243$), with 1–4 children (84, $n = 192$). The mean age of the participants was 34.94. The majority worked in the West region in either a tertiary (44.3% $n = 133$) or a secondary hospital (26.3%, $n = 79$), with a mean year of service of 11.04. The predominant nursing qualification was a diploma in nursing (a three-year pre-nurse registration program) (60.3%, $n = 181$); an additional 32.7% ($n = 98$) had an advanced diploma in nursing (a post-registration specialty program ranging from six months to one year), while only 7% ($n = 21$) had a nursing degree.

Access to Computer and Internet

Most of the nurses had access to a personal or home computer (85.3%, $n = 256$) and computer access at work (85.0%, $n = 255$). The majority of them had Internet access at home (84%, $n = 252$) and at work (71.8%, $n = 215$). The average time that they used the computer

Table 1
Demographic and background characteristics ($N = 300$).

Variable	n (%)
Age	
≤30	115 (38.3)
31–38	87 (29)
≥39	98 (32.7)
Mean ± SD (min–max)	34.94 ± 8.92 (22–56)
Gender	
Female	285 (95)
Male	15 (5)
Marital status	
Married	223 (74.3)
Single	72 (24)
Widowed/divorced	5 (1.6)
Years of service	
≤6	104 (34.7)
7–13	100 (33.3)
≥14	96 (32)
Professional qualification	
Diploma in Nursing	181 (60.3)
Advanced diploma in Nursing	98 (32.7)
Bachelor's degree in Nursing	21 (7)
Working institution	
Primary level	37 (12.3)
Secondary level	79 (26.3)
Tertiary level	133 (44.3)
Health clinic	51 (17)

varied among participants: one-third ($n = 99$) spent 2–5 h per week on the computer, 26% ($n = 78$) more than 10 h, 17% ($n = 51$) 6–10 h, and 24% ($n = 72$) 0–1 h per week. Their main computer activities were Internet searches (30%, $n = 90$) and word processing (25%, $n = 75$); however, for the less frequent users, the main items were online chat (75%, $n = 225$), library search (50%, $n = 150$), and data analysis (54%, $n = 162$).

Interest In and Preferences Regarding E-Learning

Among the 300 nurses, only 17% ($n = 52$) had participated in e-learning activities, mainly complementary (51.9%, $n = 27$) and supplementary face-to-face learning (44.2%, $n = 23$): only two nurses had participated in comprehensive e-learning. Nurses who had not participated in e-learning were asked to rate whether they were interested in doing so: 46% ($n = 115$) were very interested, 40.3% ($n = 100$) would consider it, 9.7% ($n = 24$) were unsure, and 4% ($n = 10$) said they were not interested.

Regarding the most suitable place for e-learning, one-third of participants preferred to engage at home, a quarter both at home and in the workplace, and 18% ($n = 54$) at work only. In terms of day and time, the majority preferred weekends (50.3%, $n = 151$); 21.7% ($n = 65$) preferred weekdays, and 22% ($n = 66$) evenings. In addition, regarding content, 53% ($n = 159$) preferred a theoretical emphasis, one-third preferred a practical focus, and 14.3% ($n = 43$) preferred a mix.

With regard to the most important reason for participating in e-learning, the most frequently mentioned motivation was increasing new knowledge and technical skills (mean = 4.26), followed by improving attitudes toward nursing care (mean = 4.22), clinical performance (mean = 4.18), and competencies (mean = 4.15). The least important was improved networking (mean = 4.07). The most interesting e-learning topic rated by participants was indirect nursing (mean = 4.17) (total quality management systems, quality assurance courses, communication skills), followed by general nursing (mean = 4.13), specialty nursing (mean = 4.05), management (mean = 3.99), and teaching (mean = 3.99). The topic of least interest was research. Regarding teaching/learning methods that should be included in CNE by e-learning, participants mentioned synchronous learning (65%, $n = 195$)—where learners get guidance and feedback directly from facilitators—followed by asynchronous learning (35%, $n = 108$), which is less interactive and wholly self-directed.

Attitudes toward E-Learning

The mean attitude score was 101.29, SD = 11.74, with a range from 54 to 135, indicating that the majority of nurses had a positive attitude toward e-learning. In all, 58% ($n = 174$) of participants had a good attitude, whereas 42% ($n = 136$) of them had a less-than-positive attitude. A chi-squared test showed that nurses' interest in e-learning was significantly associated with positive attitude toward learning ($\chi^2 = 16.45$, $df = 3$, $p < .001$). Average hours of weekly computer use was also shown to be associated with a positive attitude toward e-learning ($\chi^2 = 8.16$, $df = 3$, $p < .043$). Nurses' professional qualification, years of service, working institution (hospital or clinic), and previous experience in e-learning were not associated with attitudes toward e-learning. The overall associations between the nurses' background characteristics and attitudes toward e-learning are presented in Table 2.

Discussion

A requirement for e-learning is that the learner has access to a computer and an Internet connection, with the experience and competency to function efficiently. The present findings showed that most nurses had access to a computer and Internet both at home and in the workplace. Overall, Internet availability (84% at home and 71.8% at work) was higher than that reported by Taiwanese public health nurses, of

Table 2
Correlation between background characteristics and attitude toward e-learning (N = 300).

Variable	N (%)		χ^2	p
	More positive attitude (score ≥ 100)	Less positive attitude (score < 100)		
Age				
≤30	54 (32.5)	61 (45.5)	5.33	0.609
31–38	52 (31.3)	35 (26.1)		
≥39	60 (36.1)	38 (28.4)		
Years of service				
≤6	51 (17)	53 (17.7)	5.39	0.71
7–13	62 (20.7)	38 (12.7)		
≥14	61 (20.3)	35 (11.7)		
Professional qualification				
Diploma in Nursing	101 (33.7)	80 (26.7)	0.69	0.405
Advanced diploma/Bachelor's degree in Nursing	73 (24.7)	46 (15.3)		
Working institution				
Primary level	24 (8)	13 (4.3)	1.47	0.628
Secondary level	43 (14.3)	36 (12)		
Tertiary level	75 (25)	58 (19.3)		
Health clinic	32 (10.7)	19 (6.3)		
E-learning experience				
Yes	37 (12.3)	16 (5.3)	3.12	0.077
No	137 (45.7)	110 (36.7)		
Average computer use (hours per week)				
≤1	33 (11)	39 (13)	8.16	0.043
2–5	66 (22)	33 (11)		
6–10	32 (10.7)	19 (6.3)		
>10	43 (14.3)	35 (11.7)		
Interest in e-learning (n = 247)				
Very interested	83 (33.2)	32 (12.8)	16.45	<0.001
Considering	40 (16)	61 (24.4)		

whom 76.7% used Internet at home and 59.4% used at workplace (Chen et al., 2008). In contrast, in a UK study, computer availability for nurses at home was 95.7%, and at the workplace it was 92.9%, while Internet availability at home and in the workplace was 91.4% (McVeigh, 2009). These numbers are much higher than those for Malaysian nurses. Greater economic development and wealth of the UK compared to Taiwan or Malaysia may explain these findings.

The present study indicated that 33% of nurses used computers for 2–5 h per week, 26% (n = 78) for more than 10 h, 17% for 6–10 h, and 24% for 0–1 h. Overall, computer and Internet use was relatively low. In Taiwan, nurses had on average 3.5 h of weekly Internet access (Chen et al., 2008; Sheen et al., 2008). In Turkey, a high percentage of nurses (39.4%) used a computer 1–3 h daily (Karaman, 2011), significantly higher than Malaysian nurses. Karaman (2011) reported that nurses who used a computer more frequently had more positive perceptions of e-learning. Thus, to increase and improve e-learning activity, organizations need to increase accessibility of computer and ICT facilities for nurses. This will continue to be a crucial point, since ICT skills and informatics competency are important for nurses to provide safe and evidence-based nursing care (Choi and De Martinis, 2013; Choi and Zucker, 2013; Eley et al., 2009).

In terms of e-learning experience, only 17.7% of the present respondents had participated in CNE by e-learning, indicating that Malaysian nurses have minimal exposure to e-learning. In a UK study, 43.5% of post-registration nurses had experienced e-learning as part of their professional nursing training, either pre- or post-registration; 50% had utilized CD-ROMs; 43.3% had utilized the Blackboard virtual learning environment; and 43.3% had utilized complex interactive methods of e-learning (McVeigh, 2009). This significant variation across countries suggests that Malaysian nurse educators and policymakers should strengthen e-learning in the professional arena.

In terms of nurses' interest in e-learning, the results indicate that CNE by e-learning is a viable option, with 46% of respondents having a strong interest and 40% being willing to consider e-learning as CNE; only 4% had no interest in e-learning at all. However, these levels of interest are lower than in Taiwan, where 91.6% of public health nurses were likely to participate in CNE offered online (Chen et al., 2008). A possible explanation for this difference may be lack of exposure to e-learning among Malaysian nurses, as most lectures in formal nursing education in Malaysia are still teacher-centered with a didactic approach (Ministry of Higher Education Malaysia, 2010). Nurses' preferred times to engage in e-learning were evenings (50.3%), weekends (43.3%), and the location preference was at home (33%), possibly due to work and family commitments.

Overall, the present study showed that Malaysian nurses agreed that e-learning was important to increase their knowledge and technical skills as well as to improve their attitudes toward nursing care, competency, and clinical performance. The e-learning topic areas of most interest were indirect nursing, such as ICT skills and quality assurance, general nursing, specialty nursing, management, and teaching. The majority preferred synchronous to asynchronous learning, meaning that they acknowledge the value and effectiveness of e-learning when the topic is of interest and guidance and feedback are clear. Sun et al. (2008) further show that course quality is strongly associated with learner satisfaction and suggest that course design, content, schedule, interactive discussion, and materials be properly prepared to enhance satisfaction and learning motivation.

The findings of this study demonstrate that the majority of Malaysian nurses (58%) had favorable attitudes toward e-learning, which aligns with other studies (Chen et al., 2008; Moule et al., 2010). A high percentage of respondents strongly agreed that e-learning is a convenient way to learn, offers a rich and flexible learning environment, provides ready access to knowledge relevant to nursing practice, and allows interaction with facilitators and others. Karaman (2011) similarly reported that nurses regarded online learning as suitable to their working habits and circumstances.

The study shows that nurses' attitudes toward e-learning was not dependent on their work experience (years of service/institution type), qualifications, or prior e-learning experience. However, average weekly computer use and interest in e-learning did positively affect attitude toward e-learning. In previous studies, public health nurses who had access to computers and hardware at their health center and possessed better computer competency had a more positive attitudes toward web-based learning (Chen et al., 2008; Yu and Yang, 2006). Chen et al. (2008) found that perceived usefulness and perceived ease of use had direct relations with attitudes toward web-based learning. Organizational support is important to enable computer access as well as technical support in a user-friendly learning environment (Chen et al., 2008; McVeigh, 2009; Moule et al., 2010). Likewise, e-learning should effectively reflect learners' perspectives (Koch et al., 2010; Lahti et al., 2014).

The findings of the study provide important implications for nurse educators to facilitate e-learning. Generally, Malaysian nurses are interested in e-learning and prefer flexible modes where they can learn at their convenience. The majority of nurses had good attitudes toward e-learning, but preferred strong direction from educators. This requires educators to improve their (ICT) skills and invest more time in developing and facilitating e-learning (Button et al., 2013; Koch, 2014). Constructivist theory stresses that all knowledge is context-bound and that individuals make personal meaning out of their learning experiences. This suggests an active role for educators in the teaching/learning environment. This would facilitate social interaction to help students learn from one another and develop high-quality learning materials that reflect learners' perceptual knowledge, including multimedia (Kala et al., 2010).

However, this study is limited by the lack of nurses from private institutions, meaning that the results are not representative of the

Malaysian nurse population. Another limitation is the subjectivity of self-reported responses, which means that the accuracy of information provided cannot be ensured.

Conclusion

E-learning has been viewed as a convenient and flexible mode of learning that can serve as an effective alternative to face-to-face learning for professional development. Implementation of e-learning modules as part of CNE is believed to be cost-effective. However, the development of e-learning for nurses still requires assessment of availability of computers and the Internet, nurses' interest in and preferences regarding e-learning, and their attitudes toward e-learning, so that educators can better understand their needs and perspectives. This study provides important insights in this regard, suggesting that (Malaysian) nurses are ready to adopt e-learning, with a favorable attitude toward it. Access to and use of computer and Internet facilities, however, was relatively low, and only a small percentage of the respondents had e-learning experience. The results of this study on e-learning for CNE in Malaysia are useful for constructing guidelines for regional areas such ASEAN, who share similar demographic features and cultural beliefs.

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